REMARKS

This Amendment is responsive to the Office Action dated April 20, 2011. Applicant has added claim 89. Claims 1–89 will be pending upon entry of this Amendment.

Allowable Subject Matter

In the Office Action, the Examiner objected to claim 37 as including subject matter that would be allowable if rewritten in independent form. Applicant thanks the Examiner for the indication of allowable subject matter, but respectfully declines to rewrite claim 37 into independent form at this time. As discussed below, independent claim 1 from which claim 37 depends is patentable over the cited art.

Claim Rejection Under 35 U.S.C. § 103

In the Office Action, claims 1–11, 13, 14, 17–36, 38–50, 52–84, 87, and 88 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Chapoulaud et al., U.S. Publication No. 2002/0028417 (hereinafter, "Chapoulaud") in view of Fujita et al., U.S. Patent No. 5,712,965 (hereinafter, "Fujita"). In addition, claims 12, 15, 16, 20, 21, and 56 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Chapoulaud in view of Fujita, and further in view of Seidl, U.S. Patent No. 5,583,977 (hereinafter, "Seidl"). Claim 26 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Chapoulaud in view of Fujita, and further in view of Wiechmann et al., U.S. Publication No. 2003/0152884 (hereinafter, "Wiechmann"). Claims 29, 30, 65, 66, and 79 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Chapoulaud in view of Fujita, and further in view of Kopelman et al., U.S. Publication No. 2003/0014509 (hereinafter, "Kopelman"). Finally, claims 85 and 86 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Chapoulaud in view of Fujita, and further in view of Taub et al., U.S. Patent No. 6,334,772 (hereinafter, "Taub").

Applicant respectfully traverses the rejection. For at least the reasons discussed below and in the Amendment filed on February 7, 2011, the applied references, alone or in any combination, fail to disclose or suggest the features defined by Applicant's claims, and there would have been no apparent reason for modification to the applied references to arrive at the claimed features. Applicant maintains the remarks submitted in the Amendment filed on

February 7, 2011. In the remarks below, Applicant addresses the Response to Arguments presented in the Office Action, as well the rejection of dependent claims 85 and 86 based on Chapoulaud in view of Fujita, and further in view of Taub presented for the first time in the Office Action.

Independent Claims

As discussed in the Amendment filed on February 7, 2011, Fujita discloses a method contradictory to that recited in Applicant's claim 1 because in Fujita, the location of the object (which the Office Action appeared to propose replacing with an orthodontic appliance) is based on movement of the rectangular parallelepiped (a plurality of "planar guides" according to the Office Action), whereas claim 1 recites, as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, rendering the 2D planar guide at a location that is based on at least one of a position or an orientation of the orthodontic appliance within the 3D environment.

In the Response to Arguments section of the present Office Action, the Examiner disagreed with Applicant's remarks, and stated that, "in Fujita the position of the parallelepiped, as the object is being moved, is based on the final position of the object as intended by the user. Thus, the planar guides (i.e., the faces of the parallelepiped) of Fujita are rendered at a location that is based on a position of the orthodontic appliance (i.e., the object circumscribed by the parall piped [sic]), where the position is the final position of the object."[1] Thus, the Examiner appears to have acknowledged that in Fujita, the position of the parallelepiped is not based on the position or orientation of the object within the 3D environment because the position of the parallelepiped is based on an "intended" final position of the object. An "intended" final position of the object (i.e., a position not yet achieved by that object) cannot reasonably be characterized as the position or orientation of that object within the 3D while moving in the 3D environment since the object is not in the "intended" position until after the object is actually moved within the 3D environment.

Claim 1 does not require rendering a planar guide at a location that is based on an intended position of an orthodontic appliance in the future once moved by the user, but, rather, specifies that the planar guide is rendered at a location that is based on at least one of a position

[1] Office Action dated April 20, 2011, pages 8 and 9, item 22 (emphasis added).

or an orientation of the orthodontic appliance within the 3D environment. In contrast, the location of the parallelepiped disclosed by Fujita is unrelated to the position or orientation of the solid within a 3D environment because in Fujita, the rectangular parallelepiped is first rotated (e.g., based on movement of a computer mouse[2]), and the solid object is subsequently moved.[3] In Fujita, the object does not achieve the position or orientation within a 3D environment until after the parallelepiped is rotated. As such, the parallelepiped in Fujita cannot function as a planar guide as the user moves an appliance; Fujita requires that the parallelepiped be moved separate from and prior to moving the solid object.

This distinction is made further clear by the language of claim 1 that requires that as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, the planar guide is rendered at a location that is based on at least one of a position or an orientation of the orthodontic appliance within the 3D environment. Contrary to the Examiner's assertions, in Fujita, the parallelepiped is not rendered at a location that is based on the position of the object as the object is being moved by the user. Indeed, given the fact that in Fujita, the practitioner does not move the solid object, but, rather, moves the parallelepiped, Fujita fails to disclose that the parallelepiped is rendered at a location as a practitioner moves the solid object within a 3D environment.

Fujita discloses a technique in which a point on the rectangular parallelepiped is selected, and then an edit operation is performed on the selected point of the parallelepiped, rather than directly on the object the parallelepiped circumscribes.[4] The rectangular parallelepiped of Fujita is rotated (or translated), and the solid object is subsequently rotated or translated, such that the parallelepiped is not rendered at a location that is based on at least one of a position or an orientation of the solid within the 3D environment as the solid is moved within the 3D environment. In fact, quite the opposite from Applicant's claim, in Fujita, the solid object is ultimately rendered based on the orientation of the parallelepiped, which the Examiner is characterizing as the planar guide. Applicant's claim, however, makes clear that it is the planar guide that is rendered at a location that is based on at least one of a position or an orientation of the orthodontic appliance within the 3D environment. Moreover, according to claim 1, the planar guide is rendered based on the position or an orientation of the orthodontic appliance as

[2] Fujita, col. 18, ll. 6–19.
[3] *See* Fujita, FIGS. 17A–17C.
[4] *Id.* at col. 5, l. 67 – col. 6, l. 5.

the user is moving the orthodontic appliance within the 3D environment. In Fujita, it is the solid object that is subsequently rendered based on movement or rotation of the parallelepiped. Contrary to the Examiner's assertion, the parallelepiped in Fujita cannot function as a planar guide that is rendered at a location based on at least one of a position or an orientation of the orthodontic appliance within the 3D environment as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, as recited by claim 1.

In the Office Action, the Examiner disagreed with Applicant's assertion that in Fujita, the parallelepiped is moved "independently" of the object it circumscribes. The Examiner stated that "the final position of the parallelepiped after it is move dictates the new position of the object." This, however, does not establish that the location of the parallelepiped of Fujita is dependent on the position of the object as the object is moved by the user, as the Examiner appears to assert, but further supports Applicant's statements. In Fujita, the "position of the parallelepiped dictates the new position of the object" because the parallelepiped is moved independently of the object it circumscribes and the object is subsequently moved based on the edit operation performed on the rectangular parallelepiped. For at least this reason, Fujita does not disclose "as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, rendering the planar guide at a location that is based on at least one of a position or an orientation of the orthodontic appliance within the 3D environment," as recited by Applicant's claim 1. Applicant did not mean to suggest that there is no relationship at all between the movement of the parallelepiped and the subsequent movement of the object in Fujita, but rather that the disclosure of Fujita that requires the parallelepiped to be moved by the user so as to direct the subsequent movement of the solid object is fundamentally different from Applicant's claim 1 which requires a planar guide that is rendered at a location based on at least one of a position or an orientation of the orthodontic appliance within the 3D environment as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment.

For at least these reasons and the reasons discussed in the Amendment filed on February 7, 2011, the Office Action failed to establish a *prima facie* case of obviousness with respect to claim 1, as well as independent claims 4, 39, and 75. The other references of record fail to overcome the fundamental deficiency in Chapoulaud in view of Fujita discussed above.

Dependent Claims

Claims 2, 3, 5–38, 40–74, and 76–86 depend from one of independent claims 1, 4, 39, and 75, and are patentable over the cited references for at least the reasons given above and in the Amendment filed on February 7, 2011. In addition, claims 2, 3, 5–38, 40–74, and 76–86 recite additional features that are neither disclosed nor suggested by neither Chapoulaud nor Fujita or any of the other cited references. Seidl, Wiechmann, Kopelman, and Taub each fails to overcome the fundamental deficiencies in Chapoulaud and Fujita described above with respect to claim 1. Applicant addresses some of the dependent claims below for purposes of illustration.

Claim 80, for example, specifically requires a guide control module that computes a planar guide orientation of the planar guide based on the placement of the orthodontic appliance within the 3D environment relative to the dental arch. As explained above, in Fujita, it is the orientation of the solid object that is computed from parallelepiped, which the Examiner characterizes as a planar guide. This appears to directly contradict the language of dependent claim 80.

Claim 85 depends from claim 1 and specifies that the planar guide comprises an occlusal planar guide, and displaying a planar guide further comprises rendering the occlusal planar guide to penetrate an occlusal surface of the digital representation of the tooth. Claim 86 depends from claim 1 and specifies that the planar guide comprises a distal planar guide, and displaying a planar guide further comprises rendering the distal planar guide to penetrate a distal edge of the digital representation of the tooth.

In support of the rejection of claims 85 and 86, the Office Action acknowledged that Chapoulaud and Fujita do not explicitly disclose the planar guides of claims 85 and 86, and cited Taub in an attempt to overcome this deficiency. The final Office Action characterized the reference lines 60, 62 disclosed by Taub as "guides," and asserted that it would have been obvious to modify a method disclosed by Chapoulaud in view of Fujita to include "displaying an occlusal guide which penetrates an occlusal surface of the tooth and a distal guide which penetrates a distal edge of the tooth, in order to position the appliance based on the size and shape of the tooth as taught by Taub (column 7, lines 42-57)."[5] Applicant respectfully disagrees.

Contrary to the assertions in the final Office Action, the reference lines 60, 62 disclosed by Taub are not two-dimensional planar guides that penetrate an occlusal surface or a distal edge

[5] Office Action dated April 20, 2011, pages 7 and 8, item 19.

of a digital representation of a tooth. Instead, according to Taub, the reference lines 60, 62 "define the extreme boundaries of the teeth"[6] and are one-dimensional. Moreover, Taub fails to disclose or even suggest that the lines 60, 62 penetrate any surface or edge of a tooth. Taub further fails to disclose or suggest that the lines 60, 62 are displayed within a 3D environment and merely states that the lines 60, 62 are part of an image, and, therefore, the lines 60, 62 cannot reasonably be characterized as the planar guides of claims 85 and 86, which are displayed within a 3D environment. For at least these reasons, even if Chapoulaud in view of Fujita was modified in further view of Taub, the resulting method would not have included each and every element of claims 85 and 86.

The Office Action also failed to identify a reason with a rational underpinning that would have caused one of ordinary skill in the art to modify Chapoulaud in view of Fujita, and further in view of Taub.[7] The Office Action appeared to assert that it would have been obvious to modify the parallelepiped disclosed by Fujita with the one-dimensional lines 60, 62 disclosed by Taub "in order to position the appliance based on the size and shape of the tooth as taught by Taub."[8] In support of the rejection of claim 1, the Office Action appeared to assert that it would have been obvious to modify Chapoulaud in view of Fujita such that the parallelepiped circumscribes the orthodontic appliance of Chapoulaud. The lines 60, 62 disclosed by Taub, however, "define the extreme boundaries of the teeth,"[9] such that even if Chapoulaud in view of Fujita was modified in view of Taub in the manner proposed in the Office Action, the parallelepiped disclosed by Fujita would not be modified in view of the lines 60, 62 disclosed by Taub. Indeed, the reason for the modification asserted in the Office Action, i.e., "to position the appliance based on the size and shape of the tooth,"[10] fails to identify a reason why one having ordinary skill in the art would have modified the parallelepiped disclosed by Fujita and only appears to identify a reason why one having ordinary skill in the art would have modified Chapoulaud to include the image with the reference lines 60, 62 disclosed by Taub.

For at least these reasons, the Examiner has failed to establish a *prima facie* case for non-patentability of Applicant's claims 1–36 and 38–88 under 35 U.S.C. § 103(a). Applicant respectfully requests reconsideration and withdrawal of this rejection.

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[6] Taub, col. 7, ll. 43–46.
[7] *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).
[8] Office Action dated April 20, 2011, pages 7 and 8, item 19.
[9] Taub, col. 7, ll. 43–46 (emphasis added).
[10] Office Action dated April 20, 2011, pages 7 and 8, item 19.

New Claim

Applicant has added claim 89 to the pending application. The applied references fail to disclose or suggest the features defined by Applicant's new claim, and there would have been no apparent reason for modification to arrive at the claimed features. No new matter has been added by the new claim.

CONCLUSION

All claims in this application are in condition for allowance. Applicant does not acquiesce as to any assertion in the Office Action with respect to the cited art or to Applicant's claims. Applicant's silence with respect to any assertion in the Office Action should not be interpreted as Applicant's acquiescence thereto. Applicant reserves the right to comment further with respect to the applied references and any pending claim in a future Amendment, Response, or on appeal. Applicant respectfully requests reconsideration and prompt allowance of all pending claims.

Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

Date:
July 20, 2011

By:
/Jessica H.K. Rauckman/
Name: Jessica H. Kwak Rauckman, Reg No. 58,975

SHUMAKER & SIEFFERT, P.A.
1625 Radio Drive, Suite 300
Woodbury, Minnesota 55125
Telephone: 651.286.8346
Facsimile: 651.735.1102